Re-Entering Buildings Following Chemical Attack: Measuring the Effectiveness of Surface Decontamination

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Key Words: chemical attack, surface wipe, building re-entry, pesticides

Prior to re-entering a building following a chemical attack, decontamination and testing must be conducted to determine whether toxic agents have been eliminated or reduced to safe levels. Building contents must also be decontaminated and tested or destroyed. Recent incidents in the news, including the ricin scare in a Senate office building and an incident in Belgium involving hydrazine and phenarsazine, serve to remind us that chemical attacks are a very real possibility. The Belgium incident also serves to emphasize the fact that readily available common industrial chemicals may be used in an attack, not just traditional chemical weapons. In order to ensure safe re-entry into a building following such an attack, methods are needed for measuring the levels of a variety of industrial chemicals on building surfaces following the decontamination process. The objective is to develop rapid and sensitive procedures for determination of widely used and commercially available pesticides on representative hard surfaces commonly found in building structures and contents.

Readily available pesticides, including carbaryl, bendiocarb, propoxur, imidacloprid, and diphacinone, were applied to hard surfaces using a customized spray chamber. Hard surfaces were chosen to be representative of building contents and structural materials and included formica, plastic, glass, and galvanized steel. Surface sampling consisted of wiping with organic solvent-moistened gauze pads. The gauze pads were extracted using pressurized fluid extraction. The extract was analyzed by liquid chromatography tandem mass spectrometry.

Products developed from this project will include protocols for conducting surface wipes to collect toxicant(s) from contaminated building surfaces, as well as the detection and quantitation of compounds captured in them. Since the selected toxic compounds in this study will encompass a wide range of physical and chemical properties, the techniques could be applied to a wide variety of industrial chemicals and other chemical agents. These protocols and analytical procedures will be available for use by EPA and its partners in an emergency response to chemical terrorism and will provide tools for ensuring that buildings and contents are safe for re-entry and re-use following chemical attack, thereby eliminating the tremendous financial burden of acquiring new materials for use by building occupants.